



An Assessment of the Role Urban Trees Play in Modifying Weather in a City Park

2020 Globe Virtual Meeting Student Showcase



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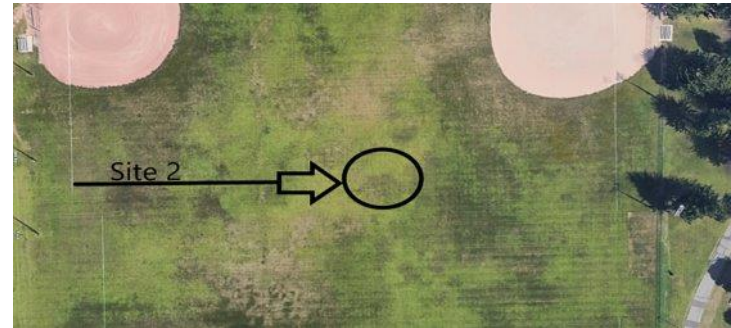


Introduction

To assess the role trees play in modifying microclimates, an investigation was developed to measure the size (height and DBH) of over 120 trees at a park in Dearborn, Michigan. With the help of a professional forester, trees were identified by names for future research. The GLOBE Observer App helped to collect and submit the data. Also, two PASCO weather stations helped to determine how trees modified selective weather parameters like wind speed, temperature, and relative humidity of two different sites in Levagood Park. Site 1 was an area centered among a group of trees, while Site 2 was in an open short grass field without surrounding trees. Students would go to the sites, place their devices, and begin recording simultaneously for approximately 15 minutes. The data was then used to make graphs for comparing the two data sets. After analyzing the data, multiple correlations were found between them. Although the data was collected during the winter with no leaves on trees, we hope to continue our research during the active growing season of 2020 to see any differences.



Site 1: Forested area



Site 2: Center of a baseball field



Research questions

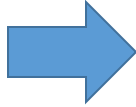
- ◆ Do trees make make a difference in modifying various atmospheric parameters, such as temperature, humidity, wind speed, and wind chill?
- ◆ How significant are the differences in the select measured atmospheric parameters between the two sites?
- ◆ What causes these parameters to be different or similar between the two sites?



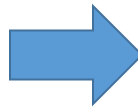
Research Methods



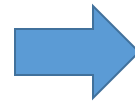
Measure 30.48 meters (100 ft) from the base of the tree



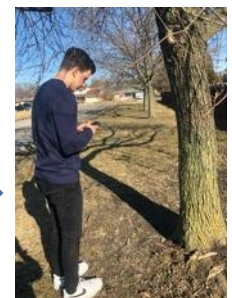
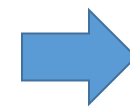
Point the GLOBE Observer App to the top and base of the tree



Calculate how many steps to the tree



Measure the Circumference of the tree



Calculate each tree height using the GLOBE Observer App

Setting up the weather station in the grove of trees



Deploying the weather station in the field

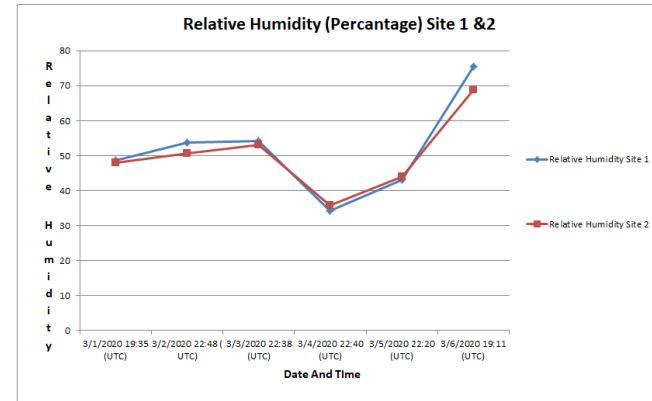
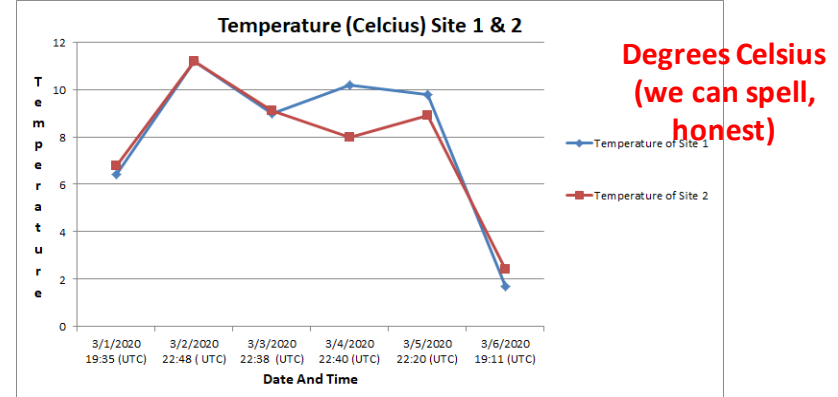


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Results

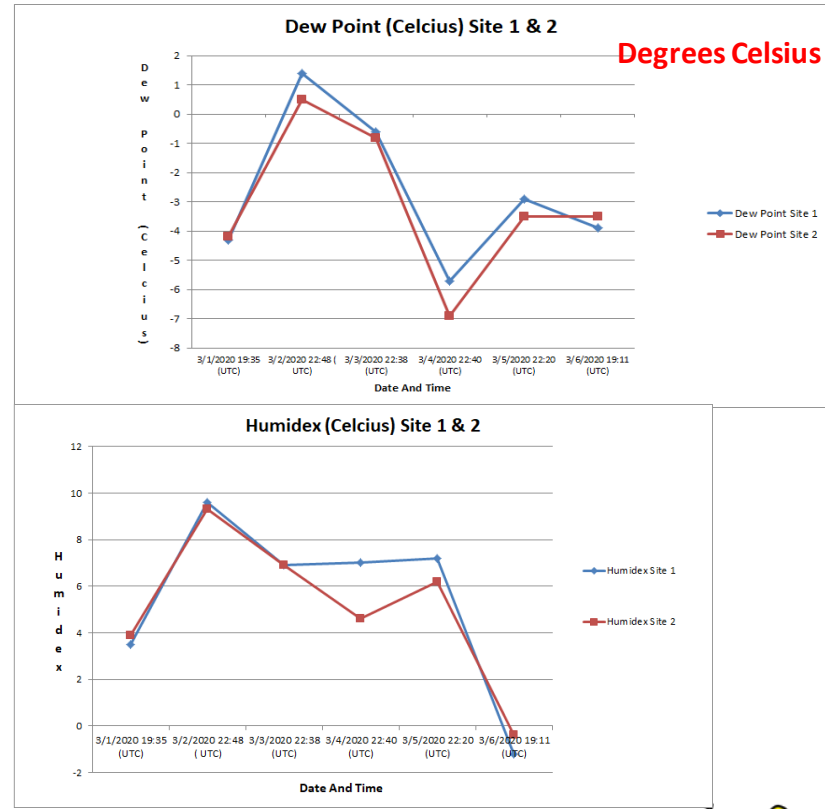
- ◆ Temperatures were not significantly different at either site except on one day when Site 1 had a higher temperature
- ◆ The relative humidity each site had similar trends but Site 1 had slightly higher readings on 4 of the days data was collected



Results

- ◆ The dew point was higher at Site 1 all of the days sampled except for one
- ◆ The Humidex was slightly higher or the same 4 out of the 6 days data was collected

Dew point is the temperature at which water vapor condenses and humidex (short for humidity index) values that are low compare to little or no discomfort but higher values can either cause discomfort or be dangerous.



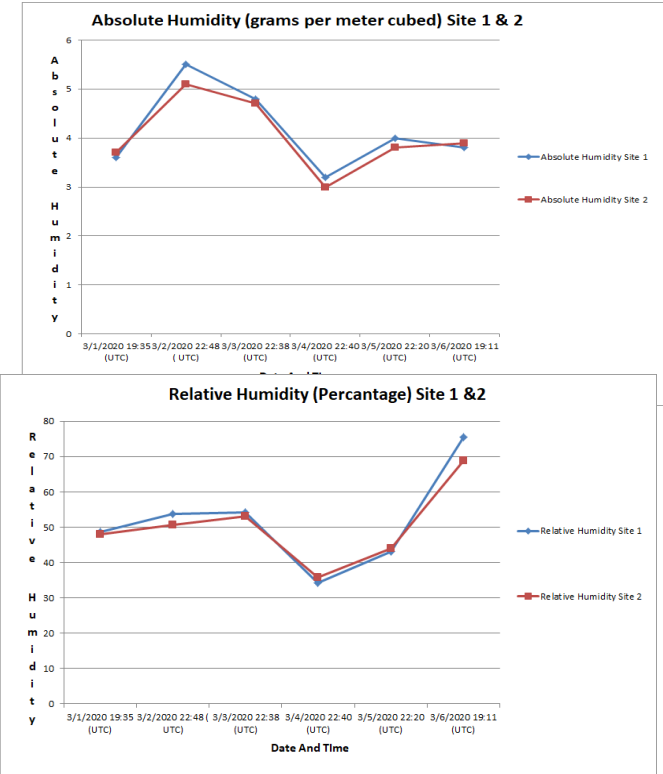
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Results

- ◆ The absolute humidity was higher for Site 1 on all of the days sampled except for two
- ◆ The relative humidity results for Site showed little to no variation between both sites

Absolute humidity (g/m^3) measures how much water vapor is in the air no matter what the temperature is. Relative humidity is a comparison between how much water vapor there is in the atmosphere compared to how much the air could hold at that temperature and is expressed as a percent.



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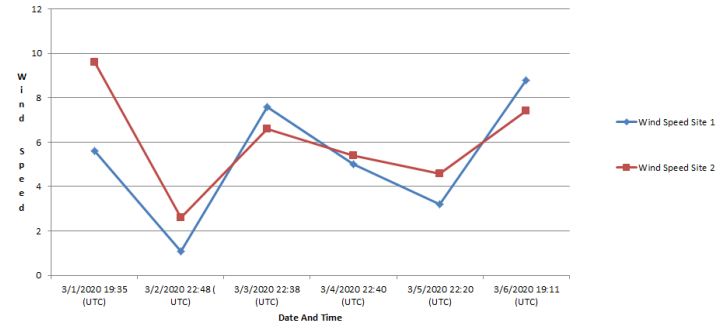


Results

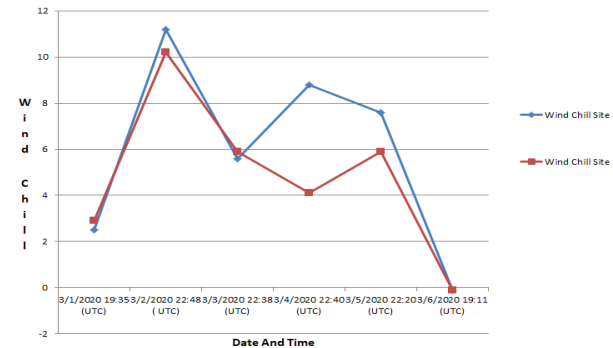
- ◆ The wind speed showed more variation between the two sites than other measured atmospheric parameters – it was higher in the field (Site 2) 4 out of the 6 days
- ◆ Windchills at both sites were fairly similar except on one occasion

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Temperau Barometri Ambient A Relative H Dew Point Absolute t Wind Spee Wind Chill Humidex (Wind Direction (Degrees)												
2	3/1/2020	6.8	991.7	6.8	48.1	-4.2	3.7	9.6	2.9	3.9	173		
3	3/2/2020	11.2	982.2	11.2	50.6	0.5	5.1	2.6	10.2	9.3	258		
4	3/3/2020	9.1	978	9.1	53.1	-0.8	4.7	6.6	5.9	6.9	288		
5	3/4/2020	8	991.4	8	35.9	-6.9	3	5.4	4.1	4.6	300		
6	3/5/2020	8.9	990.3	8.9	43.9	-3.5	3.8	4.6	5.9	6.2	188		
7	3/6/2020	2.4	999.5	2.4	68.9	-3.5	3.9	7.4	-0.1	-0.4	287		
8													
9													

Wind Speed (Kph) Site 1 & 2

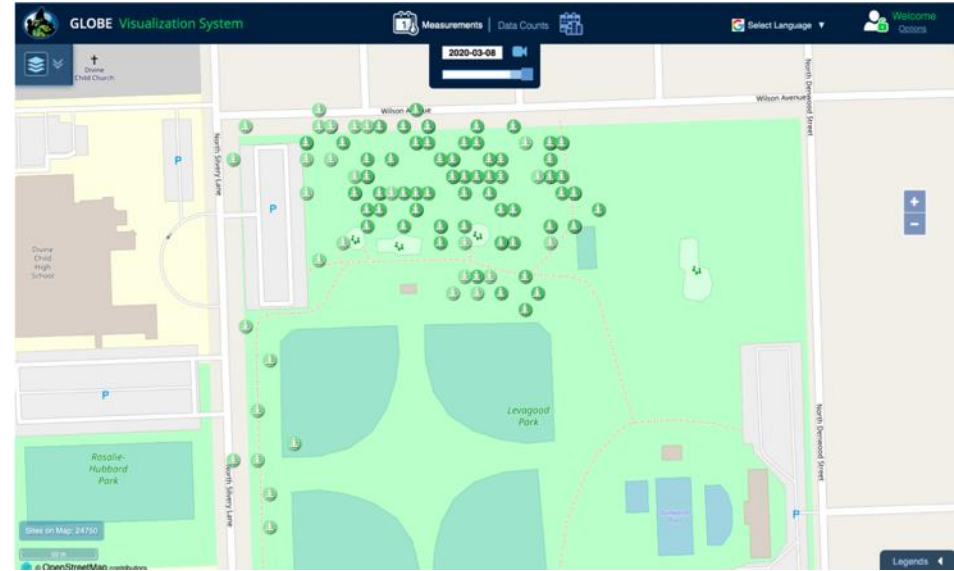


Wind Chill (Celcius) Site 1 & 2



Discussion

- ◆ Of all the weather parameters measured, only wind speed showed even the smallest significant variation between the two sites
- ◆ Lower wind speeds in the grove of trees was most likely due to trees blocking and restricting the wind, the field didn't have any barriers to restrict air flow



The grove of park trees that were measured average about 10% conifers and 90% deciduous trees.



Conclusion

- ◆ 6 days of data collection showed only minor variations in the values collected from each site at our local park
- ◆ Temperatures, dew point, wind speed, etc. showed only minor differences, none of which were significant enough to draw conclusions
- ◆ A greater amount of data must be collected over a longer period of time to assess any differences that might exist between the 2 sites



Since most of the trees in the park are deciduous trees, we are looking forward to see how increased canopy cover affects various weather parameters.

